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Synthesis of Radioactive Iodine^{131} Analog of DDT[1]

By Jens A. Jensen and George W. Pearce

The iodine^{131} analog, 1,1,1-trichloro-2,2-bis-(*p*-iodo^{131}-phenyl)-ethane, of DDT has been prepared by the steps

$$C_6H_5NH_2 + HNO_2 \xrightarrow[NaNO_2]{HCl} C_6H_5N_2Cl \quad (1)$$

$$C_6H_5N_2Cl + NaI^{131} \longrightarrow C_6H_5I^{131} \quad (2)$$

$$2C_6H_5I^{131} + CCl_3CHO \xrightarrow{ClSO_3H} \begin{matrix} I^{131}C_6H_4 \\ I^{131}C_6H_4 \end{matrix}\!\!>\!CHCCl_3 \quad (3)$$

The method of Lucas and Kennedy[2] was used for the first two steps. Twenty-two millimoles of aniline was converted to 15 millimoles of iodobenzene, using 22 millimoles of NaI in which 25 millicuries of NaI^{131} was incorporated. The steam distilled product plus 6 millimoles of inactive iodobenzene was condensed with 8 millimoles of chloral using chlorosulfonic acid as condensing agent. Recrystallization of the crude product from 1 to 1 acetone–alcohol gave 1.42 g. (2.6 millimoles) of DI*DT, m.p. 173–174°, 25% yield based on iodobenzene. Activity recovery was 22.4% corrected for decay, but not for inactive iodobenzene added. Specific activity was 2.5 microcuries per milligram. The synthesis can be completed in 2–3 days.[3]

(1) From the Technical Development Branch, Communicable Disease Center, U. S. Public Health Service, Federal Security Agency, Savannah, Georgia.

(2) "Organic Syntheses," Coll. Vol. II, John Wiley and Sons, Inc., New York, N. Y., 1946, p. 351.

(3) For detailed description order Document 3488 from American Documentation Institute, 1719 N Street, N. W., Washington 6, D. C., remitting $1.00 for microfilm (images 1 inch high on standard 35-mm. motion picture film) or $1.20 for photocopies (6 × 8 inches) readable without optical aid.

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